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4 United States of America, resident of Fairfield, County of Solano,
5 State of California; and THOMAS J. BALK, a citizen of the
6 United States of America, resident of San Francisco, County of San Francisco,
7 State of California, have invented new and useful improvements in a

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**SYSTEM AND METHOD FOR NEW PRODUCT
CLEARANCE AND DEVELOPMENT**

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1 **SYSTEM AND METHOD FOR NEW PRODUCT**
2 **CLEARANCE AND DEVELOPMENT**
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12 **II. FIELD OF THE INVENTION**

13 This invention relates to system and method for new product clearance and
14 development, especially for new or customized chemical products.

15 **III. BACKGROUND OF THE INVENTION**

16 To gain a competitive advantage, manufacturing companies continually seek to
17 improve alignment of their goods offered for sale with the requirements of their
18 customers. By only offering goods meeting client requirements, a manufacturing
19 company also avoids carrying unwanted inventory.

20 Large manufacturing concerns selling products in different regions of the world
21 face problems of non-uniform quality across regions. This is due to different raw

1 materials obtained locally in each region and different understandings of the
2 customer's requirements. A product not meeting the customer's specifications
3 may be unsellable, thus resulting in a large financial loss. An efficient product
4 development process is more economical and can result in better uniformity in
5 product quality and higher customer acceptance rates.

6 In complex manufacturing operations, new product development involves
7 multiple participants, from multiple disciplines and regions. The development
8 process can result in many reports, proposals, memos, analysis, letters, and
9 other documents. Without an adequate system, such documents may be lost, in
10 conflict with one another, interpreted differently by different participants, not seen
11 by persons intended to see them, and other such problems tending to cause
12 inefficiencies and reduce product acceptance by the customer.

13 Part of new product development and commercialization for products includes
14 assuring/checking compliance with all laws and regulations of all countries where
15 the product will be made, transported, or sold. Such laws and regulations may
16 cover environmental, health and safety, toxicology, transportation, intellectual
17 property and other matters. Not meeting the requirements of such laws and
18 regulations could result in large fines.

19 In today's global economy, decisions must be made quickly; information must be
20 communicated quickly and accurately across regions of the world to the right
21 person at the right time and in the right format.

22 Accordingly, there is a need for a new system and method for new product
23 clearance and development, especially for new or customized chemical products.
24 The method and system of the invention described herein provides such a
25 solution.

IV. SUMMARY OF THE INVENTION

The invention includes a method for product development including: determining customer requirements for a product; storing the requirements in a computer readable database; evaluating economics of developing the product per the customer requirements; storing the evaluation in the computer readable database; selecting a base technology; storing the selection in the computer readable database; determining modifications needed of the base technology to meet the final requirements; storing information of the determination in the computer readable database; and testing the determination to verify it meets the final requirements; and storing details and results of the testing in the computer readable database.

Another embodiment of the invention includes a method of product development including: determining customer requirements for a product; storing the requirements in a computer readable database; and determining if base technology modifications are needed to meet the customer requirements.

If base technology modifications are needed to meet the customer requirements, then the method further includes: selecting a base technology; storing the selection in the computer readable database; determining modifications needed of the base technology to meet the final requirements; and storing information of the determination in the computer readable database. If the cost of the modification exceeds a predetermined amount, then the method further includes: evaluating economics of developing the product per the customer requirements; storing the evaluation in the computer readable database; qualifying the determination of modifications to verify it meets the final requirements; and storing the qualification in the computer readable database.

1 Another embodiment of the invention includes a product development and
2 commercialization management information system including: a collaborative
3 work space, where multiple participants can individually and jointly work on a
4 project: configured at least partially automating workflow of product development
5 and commercialization projects from determining customer requirements and
6 financial analysis of project viability, through determining a base technology,
7 determining any needed modifications of the base technology, and testing the
8 modified base technology to verify compliance with customer requirements.

9 It is configured for adding/changing the participants in a project; configured for
10 assigning, tracking and providing notification of tasks relating to a product
11 development project or group of projects; configured for providing a collaborative
12 work space including a secure/searchable communication repository linked to
13 product development projects or logical grouping of projects and their tasks, for
14 communications with and between project participants and customers,
15 configured for recording, channeling, and archiving the communications.

16 It is also configured for financial tracking and/or forecasting for a project or a
17 logical grouping of projects; configured for importing lab data; configured for
18 providing a secure and searchable document repository linked to projects or
19 logical groupings of projects, where the documents are in final format; and a
20 database: configured for storing a product development project's history and
21 details, the history and details including the types of data, time schedules, status
22 of all steps in the project, contact information, results of all steps in the project,
23 and documents and information supporting all steps in the project; and
24 configured for searching the stored history and details and for generating reports
25 from same; a network for connecting the collaborative workspace and database;
26 and means for providing for different levels of secure access for different users.

Another embodiment of the invention includes a product development and commercialization management information system, the system including: means for storing, retrieving, searching, modifying, and reporting customer requirements for a product; means for storing, retrieving, searching, modifying, and reporting an evaluation of the economics of developing the product per the customer requirements; means for storing, retrieving, searching, modifying, and reporting a selection of a base technology.

It also includes means for storing, retrieving, searching, modifying, and reporting a determination of modifications needed of the base technology to meet the final requirements; and means for storing, retrieving, searching, modifying, and reporting testing details and results of the determination to verify it meets the final requirements.

These and other features and advantages of the present invention will be made more apparent through a consideration of the following detailed description of a preferred embodiment of the invention. In the course of this description, frequent reference will be made to the attached drawings.

V. BRIEF DESCRIPTION OF THE DRAWINGS

Figs. 1-3 depict schematic diagrams of various embodiments of exemplary logical processes in the method of the invention.

Fig. 4 depicts a schematic diagram of one embodiment of a networked system for implementing the invention.

VI. DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

The major components (also interchangeably called aspects, subsystems, modules, functions, services) of the system and method of the invention, and

1 examples of advantages they provide, are described below with reference to the
2 figures. For figures including process/means blocks, each block, separately or in
3 combination, is alternatively computer implemented, computer assisted, and/or
4 human implemented. Computer implementation optionally includes one or more
5 conventional general purpose computers having a processor, memory, storage,
6 input devices, output devices and/or conventional networking devices, protocols,
7 and/or conventional client-server hardware and software. Where any block or
8 combination of blocks is computer implemented, it is done optionally by
9 conventional means, whereby one skilled in the art of computer implementation
10 could utilize conventional algorithms, components, and devices to implement the
11 requirements and design of the invention provided herein. However, the
12 invention also includes any new, unconventional implementation means.

13 With reference to Fig. 3, the invention includes a method for product
14 development 300. The process begins with a step 310 for initial determination of
15 customer requirements for a product. The results of such determination are
16 preferably stored in a computer readable database. The initial requirements are
17 passed to Financial Analysis Process/Step 320. There the requirements are
18 evaluated for the economics of developing the product per the customer
19 requirements. The results of such economic analysis are optionally stored in the
20 computer readable database.

21 Typically, upon a favorable economic analysis step 320, the next step is finalizing
22 the customer's requirements, step 330. The final requirements are passed to
23 step 340 for selecting a base technology. A base technology is the typical
24 starting technology which either meets all or some of the customer requirements
25 from step 330 or can be modified to meet them. In the case of a chemical
26 product, for example, the base technology may be a chemical formula to which
27 additional components may be added. In manufacturing a mechanical product,

1 e.g., an automobile, the base technology may be a particular chassis frame and
2 drive train. The results of this step are optionally stored in the computer readable
3 database.

4 Once the base technology is selected in step 340, the selection is passed to the
5 modification step 350 for determining modifications needed of the base
6 technology to meet the final requirements. The results are optionally stored in
7 the computer readable database. An important step for quality assurance is the
8 next step 360 of testing the modified base technology to verify it meets the
9 customers' final requirements and optionally storing details and results of the
10 testing in the computer readable database.

11 After validating the requirements are met in step 360, the product in one
12 embodiment is optionally commercialized in step 370. In a preferred
13 embodiment, prior to the commercialization step is a freedom to operate step
14 (not shown). The freedom to operate step includes one or more evaluations of
15 the product to assure/check compliance with laws and regulations of all
16 jurisdictions where the product will be made, transported, or sold. These laws
17 and regulations may cover environmental, health and safety, toxicology,
18 transportation, intellectual property and other matters. The mechanics of
19 evaluating compliance with the various laws and regulations is known to one
20 skilled in the art, e.g., an intellectual property attorney assures compliance with
21 intellectual property laws, a health and safety specialist assures compliance with
22 the related laws. Compliance with health and safety laws and regulations,
23 e.g., may require performing certain tests on the product and providing the test
24 results to the appropriate governmental agency in the appropriate format and/or
25 providing a list of known risks and hazards of the product and safe handling
26 techniques.

1 Commercialization includes any engineering required for setting manufacturing
2 specifications, recording the specifications, and passing the specifications to all
3 manufacturing locations. Regional differences are typically considered, e.g., for
4 a chemical product, the acceptable locally obtainable versions of the ingredients
5 are listed.

6 Figs. 1 and 2 are abbreviated embodiments of the method of the invention.
7 Fig. 1, depicts a process having a Set Requirements step 110 and a
8 Commercialization step 120. In Fig. 2, the embodiment of Fig. 1 is modified to
9 add a pre-commercialization step 220. Pre-commercialization optionally includes
10 one or more of the following: economic analysis, modification determination of a
11 base technology, or testing for quality assurance. Some of the optional steps
12 within the pre-commercialization step 220 of Fig. 2 are set out in the multiple
13 steps in the embodiment depicted in Fig. 3. Typically, whether the embodiment
14 of Fig. 2 or 3 is applied in a particular instance is optionally based on whether the
15 cost of the modification to the base technology exceeds a predetermined
16 amount. The greater the modification costs, the more justified is use of a more
17 rigorous embodiment of the method of the invention, i.e., per Fig. 3.

18 Typically, the steps are performed sequentially such that a later step is not
19 performed until all earlier steps are completed. Each above-described
20 embodiment optionally includes recycle steps from a later step to an earlier step.
21 For example, if testing step 360 shows the customer requirements are not met,
22 the process could recycle back to Set Final Requirements step 330 or
23 Select Base technology step 340.

24 Also, for each embodiment, after any step of the method, the step is optionally
25 approved by authorized persons via an approval step (not show), e.g., a project
26 manager, before proceeding to the next step. Both such sequential process flow
27 and such approval may be required by the system or on the honor system.

1 Embodiments having required sequential process flow are optionally
2 implemented by one or more steps for locking at least a portion of the steps prior
3 to the completion of all earlier steps and unlocking the steps upon completion of
4 all earlier steps. This thereby prevents entering a step out of order without
5 authorization. Such steps for locking and unlocking selected portions of a
6 database can be implemented by conventional database management system
7 technologies. Another type of locking step optionally occurs where authorized
8 personnel may terminate the method at any step, and the termination optionally
9 prevents further revision of any step in the method.

10 A complementary aspect of another embodiment of the invention is security and
11 version control. Such embodiments optionally include a locking step of at least a
12 portion of the steps after their completion, thereby preventing revision of the
13 steps without authorization. Optionally, completion of all action items is a
14 condition precedent to performance of any final approval step.

15 With reference to the embodiment depicted in Fig. 3, such embodiment also
16 optionally includes a step to maintain version control of the approved
17 Final Requirements step 330, the approved base technology selection 340, and
18 Modifications step 350, or the approved Qualification/Testing of Modified Base
19 Technology step 360. Version control may be implemented by conventional
20 database management system technologies.

21 Some prior known problems in new product development were due to different
22 participants having incorrect or incomplete information and difficulty in
23 coordinating all aspects of a project among the many participants. The method
24 and system of the invention obviates these problems in alternate embodiments
25 by manual and/or automated electronic mailing steps to one or more participants
26 and/or interested persons.

1 Such mailing steps optionally include: a step for sending an electronic mail
2 notification to a participant in the method or an interested person at any step in
3 the method and a step for sending an electronic mail notification to a participant
4 in the method or an interested person upon approval and/or completion of one of
5 the steps of the method. The email steps also may apply to communication of
6 information regarding action items associated with completing particular steps.
7 Accordingly, alternate embodiments also include a step for recording in the
8 database action items for completing one or more steps of the method,
9 electronically notifying the responsible persons of the action items, and tracking
10 completion of the action items.

11 Another alternate embodiment is where upon a termination of an instance of the
12 method having incomplete action items, will result in exercise of a step for
13 sending an automatic electronic mail notification of the termination and the
14 respective incomplete action item to each respective participant responsible for
15 each respective incomplete action item.

16 With the above email features, all participants are kept up to date on the status of
17 the project, action items due, and terminations. Manual email steps described
18 above are optionally implemented with conventional email technologies. Each
19 automated email step described above is optionally implemented by a
20 listener-type module which listens for pre-determined activities in the database in
21 the database. Upon occurrence of such activities, the listener module passes an
22 instruction to an email application to send an appropriate message. The
23 message may be a pre-determined message or the message may include data
24 from the database, e.g., action items, passed by text or by reference in the
25 instructions from the listener to the email application.

26 Many optional features of the process allow for ease of project management
27 and/or solve administration problems of prior known systems. In one

1 embodiment, there is a step for plotting the actual-versus-planned progress of
2 the steps on a timeline, for measuring and improving performance and
3 productivity of practicing the method. Preferably, one or more of the steps is at
4 least in part completed by selecting items from a menu, list box, drop down list,
5 or other selection object available in a personal computer graphical user
6 interface, thereby reducing typing time and errors.

7 Many features of some embodiments of the invention facilitate access by all
8 participants and interested persons. Preferably, the storing steps store all data
9 entered, retrieved, processed, created, stored, or modified in one or more central
10 or distributed mutually accessible databases. Access to the database is
11 optionally available globally from any personal computer having suitable client
12 software installed and suitable network connectivity. Suitable client software
13 includes, e.g., a web browser, a groupware client application, e.g., Lotus Notes
14 ®, and suitable network connectivity includes, e.g., TCP/IP communication with
15 the Internet.

16 Optionally, all participants in the method and authorized persons may access at
17 least a portion of the database, and the graphical user interface presented
18 matches the person's type of database access. Conventional database
19 management system technologies may be used to provide different access levels
20 to different persons.

21 Access typically includes a plurality of pre-defined views, thereby permitting quick
22 information sorting and searching. In some embodiments, to speed data entry at
23 least a portion of the steps include copying template forms that are stored in the
24 database thereby insuring data consistency.

25 Reference forms are also preferably stored in the database and are made
26 available to users thereby providing assistance in completing the steps.

1 Template and/or reference forms are revisable at any time by authorized
2 administrators and wherein upon the revision the forms become immediately
3 available for use by future instances of the method.

4 Administration of the database includes providing, changing or revoking user
5 access, maintaining items in various selection lists, maintaining template forms,
6 reference forms and help forms, and wherein the administration is performed
7 only by authorized persons. In one or embodiments, a key feature of the method
8 is that the administration is through a graphical user interface and does not
9 require knowledge of computing languages.

10 Another embodiment of the invention includes a product development and
11 commercialization management information system. Mechanism means of the
12 system are optionally configured to perform one or more of the steps described in
13 the method aspect of the invention described above. For each embodiment in
14 the method aspect of the invention, there is a mechanism in the
15 system/apparatus aspect of the invention for performing the steps therein, except
16 for human-performed or other non-machine performed steps.

17 Portions of the system of the invention include a collaborative workspace, where
18 multiple participants can individually and jointly work on a project: configured for
19 at least partially automating workflow of new product development and
20 commercialization. The collaborative workspace is optionally implemented with
21 existing applications such as Lotus Notes® or other groupware-type software
22 applications.

23 The collaborative workspace aspect of the invention permits access by the
24 multiple participants and interested persons. From the collaborative workspace,
25 or integral with it, are means/mechanisms for each step, e.g., determining
26 customer requirements and financial analysis of project viability, through

1 determining a base technology, determining any needed modifications of the
2 base technology, and testing the modified base technology to verify compliance
3 with customer requirements.

4 The system is configured for adding/changing the participants in a project;
5 configured for assigning, tracking and providing notification of tasks relating to a
6 product development project or group of projects; configured for providing a
7 collaborative work space including a secure/searchable communication
8 repository linked to product development with projects or logical grouping of
9 projects and their tasks, for communications with and between project
10 participants and customers, configured for recording, channeling, and archiving
11 the communications.

12 It is also configured for financial tracking and/or forecasting for a project or a
13 logical grouping of projects; configured for importing lab data; configured for
14 providing a secure and searchable document repository linked to projects,
15 i.e., instances of use of the method of the invention, or logical groupings of
16 projects, where the documents are in final format; and a database: configured for
17 storing a product development project's history and details, the history and
18 details including the types of data, time schedules, status of all steps in the
19 project, contact information, results of all steps in the project, and documents and
20 information supporting all steps in the project; and configured for searching the
21 stored history and details and for generating reports from same; a network for
22 connecting the collaborative workspace and database; and means for providing
23 for different levels of secure access for different users.

24 Another embodiment of the invention includes a product development and
25 commercialization management information system. The system includes:
26 means for storing, retrieving, searching, modifying, and reporting customer
27 requirements for a product; means for storing, retrieving, searching, modifying,

1 and reporting an evaluation of the economics of developing the product per the
2 customer requirements; means for storing, retrieving, searching, modifying, and
3 reporting a selection of a base technology.

4 It also includes means for storing, retrieving, searching, modifying, and reporting
5 a determination of modifications needed of the base technology to meet the final
6 requirements; and means for storing, retrieving, searching, modifying, and
7 reporting testing details and results of the determination to verify it meets the final
8 requirements. The above-referenced means are optionally implemented with
9 conventional database management systems.

10 Fig. 4 depicts a schematic diagram of one embodiment of a networked system
11 for implementing the invention. Clients 420 are connected to Server(s) 430 via
12 Network 410. Clients 420 include the above-described client applications. One
13 or more servers 430 are in communication with the above-described database(s)
14 storing project data. Applications residing on the server are sufficiently
15 configured to permit communication from the client applications with the
16 database. These optionally include email server applications, web site server
17 applications, and static and dynamic database management applications.
18 Network 410 optionally includes any known networks such as LAN's, WAN's,
19 MAN's, the Internet, EDI, private networks, and virtual private networks. It also
20 includes any networks providing such connectivity functions developed in the
21 future such as Internet2. Lastly, the invention is preferably configured to comply
22 with the ISO 9000 standards promulgated by the International Organization for
23 Standardization.